

CLAIMS:

1. A charge pump comprising:
 - a single voltage multiplier stage (1) for converting an input voltage (VDD) into an output voltage (Vo) under control of a clock signal (Q, Qn; CLK0), and
 - an oscillator (2) for receiving the input voltage (VDD) to generate the clock signal (Q, Qn; CLK0) having a repetition period (Tr1, Tr2) being substantially proportional to a squared input voltage (VDD^2).
2. A charge pump as claimed in claim 1, wherein the oscillator (2) comprises:
 - a control circuit (CC) for receiving the input voltage (VDD) to supply a control signal (CS) being substantially proportional to the squared input voltage (VDD^2), and
 - wherein the repetition period of the oscillator (2) is substantially linearly dependent on the control signal (CS).
3. A charge pump as claimed in claim 1, wherein the oscillator (2) comprises:
 - a capacitor (MP13, MP14),
 - a current source (MN7) for supplying a current (Io) to charge or discharge the capacitor (MP13, MP14),
 - a control circuit (MP1) for receiving the input voltage (VDD) to supply a further current (Id) being substantially proportional to the squared input voltage (VDD^2),
 - wherein the first mentioned current (Io) and the further current (Id) have a fixed ratio.
4. A charge pump as claimed in claim 1, wherein the charge pump further comprises a duty cycle modulator (3) for modulating a duty cycle of the clock signal (CLK0), the duty cycle modulator (3) comprises an input for receiving the output voltage (Vo) to adapt the duty cycle to obtain a substantially constant output voltage (Vo).
5. A charge pump as claimed in claim 4, wherein the duty cycle modulator (3) comprises:

a first comparator (COM1) for comparing the output voltage (Vo) with a reference voltage (Vr) to supply a comparison signal (COS),

5 a first integrator (C2) for generating a first saw-tooth signal (CPO) having a rising or falling slope dependent on whether the comparison signal (COS) indicates that the output voltage (Vo) is above or below the reference voltage (Vr), or the other way around,

10 a second integrator (C3) for generating a second saw-tooth signal (RA) having a slope dependent on the squared input voltage (VDD^2), and

15 a second comparator (COM2) for comparing the first saw-tooth signal (CPO) and the second saw-tooth signal (RA), the duty cycle being dependent on an instant the first saw-tooth signal (CPO) reaches the second saw-tooth signal (RA).

6. An integrated circuit for use in a charge pump comprising a single voltage multiplier stage (1) for converting an input voltage (VDD) into an output voltage (Vo) under control of a clock signal (Q, Qn; CLK0), the integrated circuit comprising:

15 an oscillator (2) for receiving the input voltage (VDD) to generate the clock signal (Q, Qn; CLK0) having a repetition period (Tr1, Tr2) being substantially proportional to a squared input voltage (VDD^2).

7. A mobile device having a charge pump comprising:

20 a single voltage multiplier stage (1) for converting an input voltage (VDD) supplied by a battery into an output voltage (Vo) under control of a clock signal (Q, Qn; CLK0), and

25 an oscillator (2) for receiving the input voltage (VDD) to generate the clock signal (Q, Qn; CLK0) having a repetition period (Tr1, Tr2) being substantially proportional to a squared input voltage (VDD^2).

8. A USB master device having a charge pump comprising:

20 a single voltage multiplier stage (1) for converting an input voltage (VDD) into an output voltage (Vo) for a USB slave device under control of a clock signal (Q, Qn; CLK0), and

25 an oscillator (2) for receiving the input voltage (VDD) to generate the clock signal (Q, Qn; CLK0) having a repetition period (Tr1, Tr2) being substantially proportional to a squared input voltage (VDD^2).